Avian and Pandemic Influenza

Information for the Healthcare Providers

HQ USPACOM/J07

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Overview

- Patient Education
- Modeling the Pandemic Threat
- Responsibilities During a Pandemic
- Prevention and Infection Control
- Characteristics of Avian Influenza (AI) Cases
- AI Case Management
- Resources

Patient Education

- **MTF staff must provide accurate answers to patient questions**
  - **Informed staff and consistent message reassures public**
- **Information for deploying personnel**
  - **No current travel restrictions**
  - **No routine screening recommended by the World Health Organization (WHO) for those returning from endemic areas**
- **Information for service members and families**
  - **Review USPACOM "Info for Soldiers and Families" briefing**
  - **Provides consistent patient education terminology/message**

Avian Influenza (AI)

Information for Healthcare Providers

Background Information

- **Pandemics have occurred throughout history**
  - **20th Century: 1918-1919, 1957, 1968**
  - **Historically, we are “due” for a pandemic**
- **Current “Bird Flu” (H5N1 strain of virus) in SE Asia**
  - **H5N1 strain has spread in birds from SE Asia to Europe, and is expected to continue spreading**
  - **Human cases primarily in SE Asia and Turkey as of Jan 2000**
    - **Expected to occur more widely as bird infection spreads**
  - **40-50% of human cases have resulted in death**
  - **Spreads to humans via bird feces, secretions, blood, or infected meat**
    - **Route of exposure may be contact, ingestion, or inhalation**
  - **So far, no sustained human-to-human (H-to-H) transmission**
  - **Ability of virus to mutate increases potential for H-to-H spread**
  - **No pre-existing human immunity to H5N1**

Why worry?

- **Routine, seasonal flu kills 36,000 in the U.S. annually**
- **Potential AI pandemic projected to be more serious**
- **Historical perspective: 1918 Spanish Flu pandemic**
  - **Over 675,000 American deaths**
  - **195,000 deaths in just one month (October 1918)**
  - **43,000 deaths among U.S. troops**
    - **Virus spread rapidly in troop transports and camps**
  - **Average American lifespan decreased by more than a decade**
  - **National death rates in ages 15-45 rose 20x over previous year**
    - **Mortality rate was 1-2.5% (“normal” flu death rate in 1918 was 0.1%)**
  - **Rapid deaths—often same day as admitted to medical care**
- **Key indicator for potential pandemic: first cases of confirmed human to human spread of avian flu**

Modeling the Threat

- **Some computer models available (i.e., FluSurge from CDC, etc.) to determine impact on medical facilities**
- **Following slides provide examples of facility and population data information from FluSurge software**
  - **Developed by CDC**
  - **Used by DoD to generate information for military treatment facilities (MTFs)**
- **Administrators and planners may be able to use these tools to better plan for PI response**

Pandemic Estimate for Mid-Sized City

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Step 1: Determine population of locale by age groups:

Age Group	Population
0-17 yrs	40,169
18-64 yrs	119,721
+ 65 yrs	29,921

Enter Data in WHITE boxes only!

VIEW ASSUMP-TIONS

Step 2: Determine basic hospital resources:

Total staffed beds:	180
Staffed ICU beds:	16
Total number of ventilators:	42

Step 3: Determine duration (6, 8, or 12 weeks) and attack rate (15%, 25% or 35%) of the pandemic:

Duration: 8 Attack rate: 25%

Step 4: Click to View Results

Notes: 1. Duration refers to the number of weeks you assume the pandemic wave to last.

2. Attack rate refers to the percentage of the population that becomes clinically ill due to influenza pandemic.

Assumptions:*

No. 1 Average length of hospital stay for influenza-related illness is 7 days.

No. 2 Average length of ICU stay for influenza-related illness is 10 days.

No. 3 Average length of ventilator usage for influenza-related illness is 10 days.

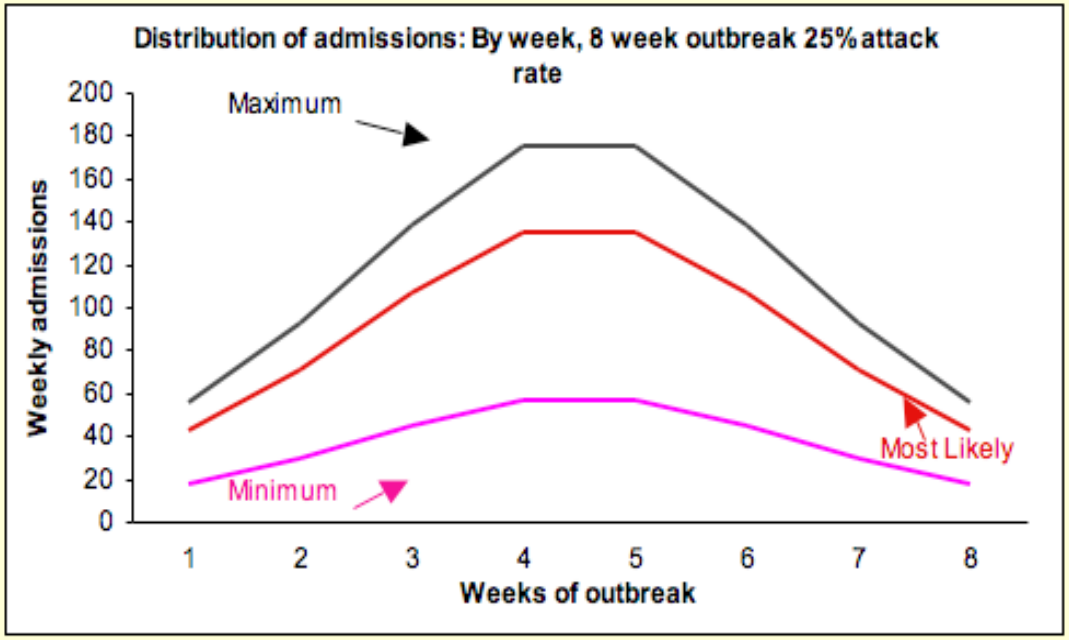
No. 4 An average of 15% of admitted influenza patients will need ICU care.

No. 5 An average of 7.5% of admitted influenza patients will need ventilators.

*IMPORTANT! Assumptions can not be changed in this version of FluSurge.

Pandemic Estimate

Influenza Pandemic Impact / Gross Attack Rate	25%
Total Hospital Admissions	
Most Likely Scenario	*707*
Minimum Scenario	295
Maximum Scenario	920
Total Deaths	
Most Likely Scenario	*145*
Minimum Scenario	89
Maximum Scenario	233



Hosp Adm. / Week	1	2	3	4	5	6	7	8
Most Likely Scenario	42	71	106	*134*	*134*	106	71	42
Minimum Scenario	18	30	44	56	56	44	30	18
Maximum Scenario	55	92	138	175	175	138	92	55

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Pandemic Estimate

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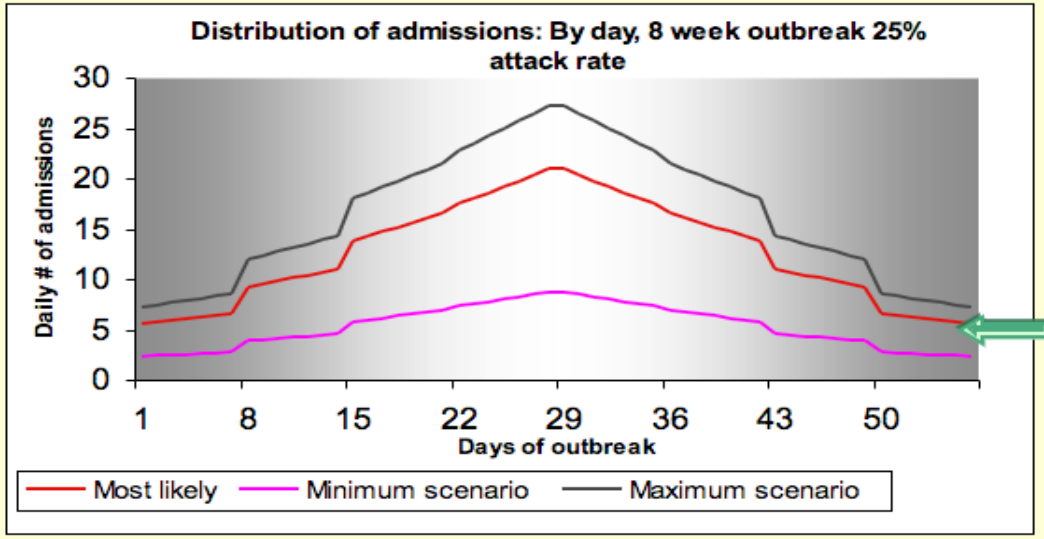

Total Hospital Admission (most likely)	707
Total Death (most likely)	145

Influenza Pandemic Impact	/ Weeks	1	2	3	4	5	6	7	8	9	10
Hospital Admission	Weekly admission	42	71	106	134	134	106	71	42		
	Peak admission/day				21	21					
Hospital Capacity	# of flu patients in hospital	42	71	106	134	141	130	101	66		
	% of hospital capacity used	24%	39%	59%	75%	78%	72%	56%	37%		
ICU Capacity	# of flu patients in ICU	6	13	21	27	30	29	23	16		
	% of ICU capacity used	40%	84%	130%	171%	185%	180%	143%	99%		
Ventilator Capacity	# of flu patients on ventilators	3	7	10	14	15	14	11	8		
	% usage of ventilator	8%	16%	25%	33%	35%	34%	27%	19%		
Deaths	# of deaths from flu			9	15	22	28	28	22	15	9
	# of flu deaths in hospital			6	10	15	19	19	15	10	6

Notes: 1. All results showed in this table are based on most likely scenario.
2. Number of flu patients in hospital, in ICU, and number of flu patients on ventilator are based on maximum daily number in a relevant week.
3. Hospital capacity used, ICU capacity used, and % usage of ventilator are calculated as a percentage of total capacity (see manual for details).
4. The maximum number of flu patients in the hospital in a week is greater than weekly admission after the peak because we assume a 7-day stay in general wards (see manual for details).

Pandemic Estimate

Table 1. Number of Episodes of Illness, Healthcare Utilization, and Death Associated with Moderate and Severe Pandemic Influenza Scenarios*

Characteristic	Moderate (1958/68-like)	Severe (1918-like)
Illness	90 million (30%)	90 million (30%)
Outpatient medical care	45 million (50%)	45 million (50%)
Hospitalization	865,000	9,900,000
ICU care	128,750	1,485,000
Mechanical ventilation	64,875	742,500
Deaths	209,000	1,903,000

*Estimates based on extrapolation from past pandemics in the United States.Note that these estimates do not include the potential impact of interventions not available during the 20th century pandemics.

According to some modeling analysis and advice of most public health experts, there will not be enough ventilators, trained staff, or other resources to manage every case during a severe pandemic

So...what will we do?

Roles During a Pandemic

- **Monitor global and community PI-related events**
- **Familiarize yourself with unit plans**
  - **Discuss, refine and update plans with colleagues**
  - **Understand concept of operations to treat multiple patient classes (inpatient, symptomatic outpatient, worried well, etc.)**
  - **Know MTF/Alternate Facility capabilities and limitations**
    - **Isolation, bed space, equipment, security, etc.**
  - **Know MTF laboratory testing capability and turn-around time**
  - **Understand disease reporting requirements**
  - **Determine availability of local/host-nation support**
- **Report cases to public health officials**
  - **Important to ensure resources are shared as equitably and efficiently as possible**
  - **Patients receive the best care**

Roles During a Pandemic

- **Increase cross-communication at all levels, ensure consistency in information and message**
  - **Reassures the public**
- **Leverage joint/inter-agency/local/host-nation resources through collaboration**
- **There will be requirements to fill roles of:**
  - **Mortuary support**
  - **Psychological support**
  - **Logistics support**
  - **Patient tracking assistance**
- **Primary care managers**
  - **Routine assessment/treatment**
  - **Know clinical and epidemiological features of PI to prepare MTFs for a pandemic**

Release of Patient Information

- **Check unit policies for release of information**
  - **Inquiries/concern from family members/deployers**
  - **Other requests for information**
- **Those releasing information need to know HIPAA restrictions and exemptions**
- **Exempt from HIPAA:**
  - **Public health information**
  - **Information for Commanders**

Public Health Emergency Officer (PHEO)

- **Has a critical role in any public health emergency**
- **DoDD 6200.3 *Emergency Health Powers on Military Installations* directs appointment of a PHEO to:**
  - **Coordinate medical response during a public health emergency**
  - **Advise commander on restriction of movement**
  - **Assist with preparations and planning**
- **PHEO Responsibilities**
  - **Confirms public health emergency**
  - **Advises commander in event of a pandemic**
  - **Must be supported by Commander and multiple command components (e.g. JAG, Logistics, PAO, security) to be effective**
  - **Conducts epidemiological investigation**
  - **Shares information with Federal, State, and local public health or safety officials**

Disease Surveillance

- **Disease surveillance is primary indicator of threat**
  - **Know routine disease occurrence (pre-pandemic) baseline**
  - **Speed in detecting out-of-norm occurrences is key**
- **Monitor occurrence of influenza-like illness (ILI)**
  - **Increase vigilance and testing of suspected cases**
  - **Maintain a high index of suspicion**
- **Use automated tools (e.g., ESSENCE)**
  - **Identifies regional and MTF-specific trends**
  - **Timely and accurate coding at MTF is critical**
  - **High sensitivity but low specificity**
    - **False alarms highly probable—requires research of cause**
- **Astute clinicians remain, as always, our best surveillance tools**

Influenza Viruses

- **Three types of influenza viruses: A, B, and C**
  - **Types A and B viruses cause illness in humans**
  - **Only type A can cause pandemics**
- **Influenza A viruses have 16 “H” and 9 “N” subtypes**
  - **Only H5 and H7 subtypes are known to cause the highly pathogenic form of the disease**
  - **Not all viruses of H5 and H7 subtypes are highly pathogenic**
  - **Not all will cause severe disease in poultry**
- **H subtypes are epidemiologically most important**
  - **Govern ability of virus to bind to and enter cells, where multiplication of the virus occurs**
  - **N subtypes govern release of newly formed virus from cells**

Typical Flu Symptoms

- **Incubation Period – 1 to 4 days (average = 2 days)**
- **Period of Illness – 3 to 7 days**
- **Infectious Period (virus able to spread human-human)**
  - **1 to 2 days prior to developing symptoms**
  - **3 to 5 days after developing symptoms (adults)**
  - **Up to 7 days after developing symptoms (children)**
  - **Infectious period may be longer if immune system is weak**
- **Typical seasonal flu signs and symptoms:**
  - **Fever (>100.4 F)**
  - **Headache**
  - **Cough**
  - **Difficulty breathing**
  - **Muscle aches**

AI Cases

- **Additional Avian Influenza signs and symptoms:**
  - **Eye infections**
  - **Pneumonia**
  - **Diarrhea and Gastrointestinal problems**
  - **Persistent fever, lymphopenia**
  - **Severe pneumonia or ARDS**
  - **Unusual presentations possible**
- **Exposure to infected fowl a factor in nearly all cases**
- **Clustering of cases may signal human to human transmission and the first sign of an emergency**

Current Case Definition for AI

- **Epidemiological evidence for exposure:**
  - **1) Travel to an affected country with known cases (e.g., Vietnam, Indonesia, China, Thailand, Iraq, etc…) and:**
  - **Exposure to handling poultry or**
    - **Close contacts in wet markets or**
    - **Close contact with person known to have handled poultry and become ill and**
  - **2) Fever (> 38C) and**
  - **3) Pneumonia, ARDS, severe respiratory illness, cough or shortness of breath**
- **Possible case: 1 + 2 + 3**
- **Probable case: 1 + 2 + 3 with positive initial lab test either:**
  - **Positive rapid influenza or**
  - **PCR for influenza A**
- **Confirmed case:**
  - **Possible or probable case with positive H5N1 PCR test or**
  - **Positive H5N1 viral culture from AFIOH lab or CDC**

Strategy for PI Prevention

- **Contain or delay spread of a pandemic influenza strain**
- **May buy time for adequate production and distribution of an effective vaccine**
  - **No large amount of vaccine expected for the first 6 to 9 months of a pandemic**
  - **After passage of the first pandemic “wave” through a region (over ~8-12 weeks), there still may be other waves in subsequent months**
- **Allows healthcare systems to better manage patients and contacts in existing facilities**

Taking Care of Yourself and Patients

- **Wash hands frequently using soap and water or waterless hand cleaners**
- **Practice social distancing**
  - **Increase personal space to limit exposure**
- **Use N-95 masks and other PPE**
  - **Use surgical masks on patients**
- **Avoid tobacco smoke**
- **Keep the flu out of the workplace!**
  - **Don’t go to work if you’re possibly sick with the flu**
- **Get your annual flu shot**

PI Infection Control

- **Specific measures for healthcare settings**
  - **Room cleaning: Normal cleaning products and procedures**
  - **Linen changes: Normal handling is sufficient**
  - **Infectious waste disposal: No additional special handling required**
- **Communication/Enforcement of unit policies**
  - **Refer questions to Infection Control personnel**

Containing PI with Antivirals

- **Theoretical models using H5N1 data from Thailand**
- **Contacts of suspected cases take antiviral agents**
- **Pandemic contained if low transmissibility (Ro number)**
- **Prophylaxis more effective when combined with quarantine**
- **Speed in detecting cases and implementation of early response “containment” is critical**
- **May be brief opportunity for U.S. medical assistance immediately after first sustained human-to-human cases appear**

Experimental Vaccines Against H5N1

- **Phase I (Safety and Immunogenicity) testing began in April, 2005 in the US**
  - **Evaluation at three NIH-supported study sites**
  - **Based on H5N1 virus from a Vietnamese boy (2004)**
  - **But, no cross-reactivity with 2005 Indonesian strain**
  - **Study size of 450 healthy adults (Age 18-64)**
- **If vaccine study is successful, plan to test in other populations (e.g. elderly and children)**

DoD Priorities for H5N1 Vaccine

- **Vaccine expected to be available to DOD personnel after FDA approval, but in limited supply**
- **Prioritization expected to match those for limited stocks of Oseltamivir**
  - **<u>Tier 1:</u> Personnel necessary to respond to global military contingencies and provide essential force health care Includes deployed forces, essential billets to maintain functioning health care system, and those required for national strategic and critical operations defined by the JS**
  - **<u>Tier 2:</u> Non-deployed forces on alert or designated to conduct critical contingency operations**
  - **<u>Tier 3:</u> Personnel necessary to maintain mission-essential capabilities at each organizational level**
  - **<u>Tier 4:</u> All other Active Components or mobilized Reserves**
  - **<u>Tier 5:</u> All other beneficiaries not previously included according to CDC priority tiers**

Management of AI Cases

- **Some similarity with management of Severe Acute Respiratory Syndrome (SARS), but some important differences**
- **Patients with fever and respiratory symptoms:**
  - **Should be managed according to recommendations for Respiratory Hygiene and Cough Etiquette and**
  - **Questioned regarding recent travel history**
- **Manage patients using isolation precautions if:**
  - **Patient traveled to country with AI activity within 10 days and**
  - **Patient is hospitalized with severe febrile respiratory illness, or are otherwise under evaluation for AI**

Isolation Precautions

- **Identical to SARS isolation precautions**
- **Standard Precautions**
  - **Pay careful attention to hand hygiene before and after all patient contact or contact with items potentially contaminated with respiratory secretions**
- **Contact Precautions**
  - **Use gloves and gown for all patient contact**
  - **Use dedicated equipment such as stethoscopes, disposable blood pressure cuffs, disposable thermometers, etc.**
- **Eye protection (i.e., goggles, face shields, etc.)**
  - **Wear when within 3 feet of a patient**

Airborne Precautions

- **Place patient in an airborne isolation room (AIR) with following characteristics:**
  - **Monitored negative air pressure in relation to corridor**
  - **6 to 12 air changes per hour (ACH)**
  - **Exhausts air directly outside or recirculates air filtered by a high efficiency particulate air (HEPA) filter**
- **If an AIR is unavailable, consider use of portable HEPA filters to augment the number of ACH**
- **Use a fit-tested respirator when entering room**
  - **Minimum standard is National Institute of Occupational Safety and Health (NIOSH)-approved N-95 filtering face piece (disposable) respirator**

Antivirals

- **Oseltamivir (Tamiflu) and Zanamivir (Relenza) are effective, but in limited supply**
  - **USPACOM contingency reserves of Oseltamivir are available**
- **Amantadine and rimantadine are ineffective against H5N1**
- **Poorly controlled use of antivirals could stimulate development of drug resistance**

Antivirals

- **Source: Mouse model of lethal H5 viral infection**
- **Oseltamivir was protective**
  - **Higher dosages needed than when treating 1997 Hong Kong cases**
  - **8-day regimen better than 5-day regimen (some instances)**
- **Probenecid**
  - **Theoretically doubles dosing interval—may save considerable expense**
  - **Limited study data**
  - **Broad safety window**
- **Is there a role for other medications that could help maintain protective serum levels?**

Antivirals

- **Antivirals to cover 20%-25% of population might be enough to treat most clinical cases and to reduce hospitalization by an estimated 50%-77%**
- **Substantial reductions in hospitalization with smaller stockpiles if drugs are reserved for high-risk persons**
  - Potential Impact of Antiviral Drug Use during Influenza Pandemic, Emerging Infectious Diseases 2005 Sep; 11(9):1355-1362
- **Use of reserve stock with “ring” or "targeted” prophylaxis may produce favorable cost-benefit ratios**
- **Antivirals administered solely as therapeutic measure or as short-term prophylaxis for exposed contacts**
  - Cost-Benefit of Stockpiling Drugs for Influenza Pandemic, Emerging Infectious Diseases 2005 Aug; 11(8):1280-1282

Statins

- **Statins may have a therapeutic role**
  - **Cholesterol-lowering effect (HMG CoA reductase inhibitors)**
  - **Inhibit cytokine release to decrease inflammatory response**
- **Infection of human lung cells with H5N1 AI virus leads to intense inflammation**
  - **Similar to victims of 1918 Spanish flu pandemic**
  - **“Cytokine storm”--Flood of inflammation-triggering chemicals released by immune systems**
- **Center for Infectious Disease Research & Policy**
  - **University of Minnesota Academic Health Center**

Statins

- **Epidemiologic study at University Medical Center Utrecht in the Netherlands**
  - **Dutch database of 60,000 primary-care patients during flu epidemics between 1996 and 2003**
  - **Patients with at least two statin prescriptions over the previous 12 months had a 26% lower risk of pneumonia and other severe respiratory ailments**
  - **Statins didn't reduce the risk during non-flu seasons, suggesting statins offer specific protection against flu complications**
    - **Source: Science 23 September 2005:Vol. 309. no. 5743, pp. 1976 - 1977**

Statins

- **Study of statins and community-acquired pneumonia**
  - **Retrospective cohort study on 787 hospitalized patients**
  - **Adjusted for potential confounders**
  - **Statin use at presentation associated with a decreased 30-day mortality rate: OR 0.36 (0.14-0.92).**
    - **Source: Respiratory Research 2005, 6:82**

Resources

- **U.S. pandemic influenza information and plan**
  - www.pandemicflu.gov
- **U.S. public health guidelines**
  - www.cdc.gov
- **Global updates and official case reports**
  - www.who.int
- **US Pacific Command avian influenza website**
  - www.pacom.mil/special/avianflu05/index.shtml

Summary

- **Strategy: Slow or contain spread of pandemic flu strain to buy time to develop a safe, effective vaccine**
- **Basic hand washing and cough etiquette will help**
- **Masks are low-cost/low-risk, and may offer some protection**
- **Vaccine is best prevention tool, but may not be available for first 6-9 months of a pandemic**
- **Oseltamivir is one proposed treatment/prophylaxis, but is in short supply**
- **“Outside the box” ideas include use of statins and other means of reducing inflammation and secondary infections**
- **Isolation and social distancing may prove effective**
- **Quarantine is of unproven benefit**

Questions?